JET PROPULSION LABORATORY TELECOMMUNICATIONS & MISSION OPERATIONS DIRECTORATE
4800 OAK GROVE DRIVE
PASADENA, CA 91109-8099
(818)-354-4086
Fax: (818)-393-3575

March 20, 1998

Ms. Ann Merwarth
Manager, HST Operations & Ground Systems Project
Goddard Space Flight Center - Code 441
Greenbelt, MD 20771

RE: HST VISION 2000 Program Review Panel Report

Dear Ann,

Attached is the report from the HST VISION 2000 Program Peer Review Panel. The Panel hopes that the inputs to you and the HST Team are helpful.

I have distributed the report to those listed below and have left the internal Project distribution for your office.

Sincerely,

Gael F. Squibb
Director for
Telecommunications and Mission Operations

Distribution
Preston Burch

Review Panel

Roger Brissenden SAO (Not Present)
David Kaslow Lockheed Martin
George Morrow GSFC
Peter Shames JPL (Not Present)
Ethan Schreier STScI
Steve Tompkins GSFC

HST VISION 2000 PROGRAM

REVIEW PANEL REPORT

STATUS REVIEW

March 11, 1998

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Gael F. Squibb
Chairman

March 20, 1998

Review Panel Members Present at the Design Confirmation Review

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Dave Kaslow -- Lockheed Martin

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Ethan Schreier STScI

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George Morrow (GSFC)

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Steve Tompkins GSFC

The Vision 2000 (V2K) review was held at GSFC on March 11, 1998. The purpose of the review was for the Review Panel to:

Confirm:

Development progress for CCS and SSM FSW Product Teams
Team status for Planning & Scheduling and Science Data Processing

Assess:

System Integration and Test
System Deployment Status
Operations Transition Plans for CCS support of Normal operations in August 1998.

and to make comments to the HST O&GS Project Manager that will aid the Project in achieving the Vision presented.

The Panel wishes to thank the presenters for the clarity and openness of the presentations that have enabled us to make comments that we hope will be helpful.

GENERAL

The overall impression of the Review Panel is very positive and we congratulate the project on the achievements since the last review. The presenters were knowledgeable, showed ownership of the systems they represented, and the Panel observed that no question caught them off guard. We have consistently made this comment in the previous review reports and this consistency in the quality of the HST V2K staff and their achievements has had a significant influence on the success of the program .

The Vision 2000 Team continues to demonstrate excellence in project management and product development. They are successfully employing an incremental development process and are responsive to changes in schedules, functionality, and COTS products.

It is apparent that the Vision 2000 development team learned a great deal from the difficult development and test effort of Release 2.2 last summer and successfully applied those lessons to Release 2.3. This was proven by the on-time delivery of 2.3 in mid-February.

The Review Panel feels that the Vision 2000 is on track for completion of its requirements. These requirements were defined several years ago. **The Review Panel suggest that now would be a good time to revisit the overall goals of Vision 2000, in light of a better understanding of the Vision 2000 capabilities, the evolution of technology, and the identification of other cost savings concepts in other spacecraft projects**. **This could be part of a formal verification audit which includes all aspects of the program.** There should be enough time left in the Vision 2000 effort that some redirection should be possible within the remaining resources.

The Review Panel believes that the purpose of the review was met.

The overall suggestion from the Review Panel to the Project is to validate the workforce savings that were assumed at the start of the project. The automation, which will enable the de-staffing to reach budget levels is yet to be done (by plan) but it is essential that the team focus on the automation and attendant work force reduction that is assumed in the future year funding. The detailed operations scenarios and planning for automation is yet to be done. As a result, there is not yet any validation of the anticipated savings in personnel. **The panel requests that an up-dated estimate of the staffing estimates be the focus of the next review along with the operational scenarios which relate to the automated system. This**

presentation should include a briefing on the development of the Automated Layer Applications at the next review. These operational scenarios should include an operator loading Analysis.

The Panel has made recommendations at the November 1996 review and the June 1997 review on the inconsistency of the staffing profile and the development plans. For example, planning and scheduling is substantially complete now, but the staffing remains at 80 people until 2001.

We repeat the observation and suggestion that was made in the June 1997 report.

STAFFING VALIDATION

At the November [1996] Review that Panel made the following observation:

The HST Operations and Ground Systems Project needs to develop separate labor profiles by fiscal year and functional element for Vision 2000 Development, Servicing Mission Support and on-going maintenance of the legacy system. The importance of understanding and conveying these separate yet interrelated profiles is of utmost importance in the budget climate that exists and will exist during the completion of the Vision 2000 project. The Panel supports the profile that was given for the total effort as shown below but believes that one who is not familiar with the project will need additional information to support the total HST effort.

Functional Area	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
Planning & Scheduling	*96*	*89*	*80*	*80*	*80*	*80*	*45*
Spacecraft Operations	*234*	*248*	*261*	*261*	*250*	*185*	*79*
Data Processing & Archive	*51*	*31*	*31*	*31*	*31*	*31*	*27*
Flight Software	*28*	*28*	*30*	*29*	*28*	*23*	*10*
Totals	*409*	*396*	*402*	*401*	*389*	*319*	*161*

The last development milestone is complete in August 1999 yet the staffing for all PDT's remains either flat or slightly decreases through 2000.

The Panel recommends that the project re-evaluate the staffing profile with the current schedules and make them consistent.

In addition to the action above, we would add at this time the validation that the developed V2K system will indeed lead to the operations staff reductions that are in the current out year plans. We understand that this is underway and would recommend that the results of this analysis as well as the answer to the November recommendation be included as a specific topic in the next review.

OPERATIONAL READINESS

The Vision 2000 Control Center System is planned to become the primary operational system for HST in August 1998 following Release 2.3A delivery. It is clear that the HST Project is well along in planning for the operational transition to Vision 2000. It is less clear that the Project has clear criteria for determining Vision 2000 operational readiness. **The panel recommends that the Project develop and document clear criteria for determining the operational readiness of the Vision 2000 Control Center System. These criteria should form the basis for internal readiness reviews and should be used to support the planned mid-August Operational Readiness Review to be chaired by the GSFC Office of Flight Assurance.**

HST VISION 2000TRANSITION READINESS REVIEW MARCH 11, 1998

CCS

The presentations on CCS verification and transition showed a careful and thorough approach. We encourage the Team to be vigilant in regression testing and to thoroughly test the transition backout scenario. The Vision 2000 Team should determine if a critical path analysis or risk review of verification and transition is really unnecessary.

Year 2000

The Vision 2000 Team has fully addressed Year 2000 GPS Week Counter rollover and leap seconds.

Data Warehouse

Data Warehouse population will begin soon and performance does not appear to be an issue. What mechanisms are in place to monitor the progress of population and verification - or are this verification solely a responsibility of the Science Institute? If so the same question applies.

Flight Software

The Flight Software development presentation showed that they are on schedule and are carefully developing and testing the software. Attitude and pointing performance requirements are being met or exceeded.

Planning & Scheduling

The Planning and Scheduling (P&S) presentations were, of necessity, brief, but the development appears to be proceeding well. The Vision 2000 Team should determine if the requirements on Planning and Scheduling are all being incorporated and verified according to plan. What mechanisms are in place to determine if the P&S functionality is satisfying the user's needs? A related question is: how do you know when P&S is good enough?

Multi Server Performance

There should be a verification of the performance of the projected multi server co figurations. The panel did not see any verification tests of this nature in the material presented.

System Maintainability

The Panel understands the decision to move away from Netscape as the prime interface. **We would like the team to address at the next review the following question:**

> **If applets will continue to be stand-alone jobs running under a local Java engine, rather than under a browser, will there be any effect on the maintainability and upgradeability for the eventual distributed system?**

Science Data Processing

The Panel recognizes the continued good performance of the Science Data Processing, as demonstrated by the incorporation of the astrometry function.